Methods, Tools, and Strategies

Evaluation of a Problem-Specific SBAR Tool to Improve After-Hours Nurse-Physician Phone Communication: A Randomized Trial

Erel Joffe, MD, MS; James P. Turley, PhD, RN; Kevin O. Hwang, MD, MPH; Todd R. Johnson, PhD; Craig W. Johnson, PhD; Elmer V. Bernstam, MD, MS, MSE

Inpatient after-hours telephone communications are a unique clinical scenario in which a nurse consults a physician by phone regarding an acute patient problem. These calls are based entirely on verbal communication, take place in a setting where scarce resources and fatigue are the rule, and are usually characterized by a paucity of information.[1] The consulted physician is often not the primary physician responsible for the patient and may have received only a very brief "sign out" (for example, "40 years old with pneumonia," "doing well") or is entirely unfamiliar with the patient. Discontinuities in care have been associated with a high risk of preventable adverse events in the hospital.[2] Thus, considering how common after-hours phone calls are in hospital medicine, there is surprisingly little research evaluating their associated risk and possible strategies of mitigation.[3]

Methods for structuring communication have been widely endorsed as the solution for reducing errors in patients' handoffs.[4] SBAR (Situation, Background, Assessment, Recommendation) is the most frequently implemented framework in the health care setting.[5] Several studies have evaluated SBAR and similar tools, but most were qualitative and focused on novice health care workers.[5] For example, in a simulation study, medical students trained in the SBAR framework communicated patient problems more clearly than students who were not trained.[6] Similarly, in another study, rates of medication reconciliation improved and adverse events decreased after institutionwide implementation of the SBAR framework[7]; (however, little detail was provided regarding methods and statistical analysis[5]). On the other hand, the accuracy of recalling handoff information in handoffs between paramedics and emergency department staff decreased with the use of a standardized mnemonic.[8]

Although SBAR may structure communication, it does not define the necessary data set to be communicated to address a specific clinical problem.[1] In other words, SBAR tells you how to communicate but not what to communicate. SBAR is also dependent on the compliance of health care professionals. Thus, while several studies describe successful institutionwide imple-

Article-at-a-Glance

Background: After-hours telephone communications are common in patient management. Patterns of communication of key information during after-hours phone calls were evaluated, and the utility of problem-specific Situation, Background, Assessment, Recommendation (SBAR) forms in improving this communication was assessed.

Methods: In a randomized trial using a simulated on-call setting, 20 nurses called physicians regarding six cases adapted from inpatient records and based on the six most common reasons for after-hours nurse-physician communication. Three of the cases were handled without the SBAR forms (control cases), and three cases were handled with the forms (SBAR cases). Two cue types of communication were evaluated: situation cues, which conveyed the patient's situation (for example, a patient is confused), and background cues, which conveyed problem-specific data indicated on the SBAR forms (for example, the patient has a low sodium level).

Results: Ninety-two phone calls were analyzed (43 SBAR/49 controls). Most of the nurses reported the situation cues (SBAR 88%, control 84%, $p = .60$) but not the background cues. There was a trend toward fewer background cues communicated in the SBAR cases (14% versus 31%, $p = .08$). In 14% of the cases, on average, nurses omitted information or reported wrong information regarding the background cue. Physicians asked questions that resulted in the communication of the cues in a minority of the cases when the background cues were not originally provided by the nurses (SBAR 6%, control 16%, $p = .39$).

Conclusions: In after-hours phone communication between physicians and nurses, significant information was often not communicated and physicians did not elicit the necessary information. Simply providing an SBAR–based form did not ensure complete communication of key information.

mentation of the SBAR framework,[5,7,9,10] sustainable improvement in patient outcomes has yet to be demonstrated.[11]

In a previous study, we performed a retrospective review of a random sample of inpatients admitted to general medical wards at an urban public teaching hospital (Texas Medical Center, Houston) in a 38-month period. For 139 (47%) of the 293 patients for whom there were documented calls from nurses to physicians, 10 categories of problems (such as pain, blood glucose, or behavior) accounted for 65% of the 304 nurse calls.[1] Subsequently, we hypothesized that by implementing SBAR forms adapted to each of these problems, we could facilitate data collection, organization, and communication. The purpose of this follow-up study was to evaluate the effect of such problem-specific SBAR forms on the information communicated by nurses to on-call physicians over the phone.

Methods

Ethical Considerations

This study was approved by the Committee for the Protection of Human Subjects (the University of Texas Health Science Center Institutional Review Board). All the participants gave written informed consent and received a $50 US gift card. Any potentially identifying information in the patients' records was erased. This was a laboratory study with physicians and nurses who were currently caring for patients on the general internal medicine wards.

Setting

The study took place from May 2010 through May 2011 at a laboratory at the University of Texas Health Science Center at Houston. An expert panel of two internal medicine specialists [E.V.B., K.O.H] and a registered nurse [J.P.T.] designed a form for each of the six most common reasons for after-hours calls as identified in the previous study.[1] Twenty-two pairs, each consisting of a registered nurse and an internal medicine physician (either an attending or a chief resident) were enrolled in the study. Both nurses and physicians had to be currently practicing on general internal medicine wards. Nurses were asked to come to the laboratory where they contacted physicians by phone.

Cases with Situation and Background Cues

We based cases on actual admissions to an urban public teaching hospital.[1] Records were modified to fit the clinical scenario and to comply with the Institutional Review Board requirements for de-identification.

Each case had two types of cues critical to the evaluation of the clinical scenario: a situation cue and a background cue.

Situation Cue. A situation cue answers the question, "What is wrong with the patient that is prompting the call?" It was meant to evaluate the generic SBAR framework, that is, a general understanding and communication of a patient's situation. For example, if the scenario was that the patient is disoriented and pulled out his intravenous line, we evaluated whether the nurses communicated to the physicians that they were calling about an acutely disoriented and confused patient.

Background Cue. A background cue concerns a specific clinical finding that answers the question, "Why does this particular patient suffer from this problem?" (for example, very low sodium level in a patient with acute confusion). It was meant to evaluate the communication of condition-specific data indicated on the SBAR forms, such as medical history, medications, and laboratory results. Because cases were based on real patient records, the case of chest pain (Table 1, page 497) was complicated by multiple comorbidities that could have been associated with chest pain (for example, chronic obstructive pulmonary disease, congestive heart failure). We made the decision to present leg swelling as part of the situation cue, so that there was no background cue in that case. The expert panel ensured that the forms covered all the pertinent data for the evaluation of each clinical scenario (sample templates are presented in Appendix 1, available in online article). Therefore, if nurses gathered and communicated the data suggested by the template, they would necessarily report both the situation and background cues.

Design and Procedure

On the basis of a randomization table with a modified Latin Square design, we presented each nurse with three clinical scenarios (cases) to be carried out with the assistance of a problem-specific SBAR form and three scenarios to be carried out without it (Table 1). We provided nurses with a medical chart (including an admission intake, progress notes, medical orders, medication, nursing notes, and laboratory and imaging results) and a bedside chart (with vital signs follow-up). We used actual hospital charts modified to fit the clinical scenario to ensure that the nurses worked with records that were as close as possible to records used in routine clinical practice. The nurses in the study could ask the nurse conducting the experiment [J.P.T.] about physical examination findings, for which there were scripted answers. If the question fell outside the scripted answers, no information was given.

First, we asked nurses to review the three non-SBAR cases (control cases) and call the physician. Then, we presented nurses with the problem-specific SBAR forms. We explained that the forms were specifically designed to fit the scenarios and requested

Table 1. Clinical Scenarios, Associated Cues, and Evaluation Criteria for the Six Cases*

Scenario	Evaluation Criteria Situation Cue†	Evaluation Criteria Background Cue†
Fever Case: A 43 y/o male admitted several days ago has a 101.5º fever and 2–3 loose stools. The patient was admitted with a urinary tract infection and has been treated with antibiotics. He was recently discharged from a prolonged hospitalization after back surgery.	Communicated fever + several days in the hospital or with antibiotic treatment	Communicated any of: Recent hospitalization/recent surgery (provided the medical history)
Glucose Case: A 48 y/o male has a standing order for insulin but blood glucose is 90 mg/dL. Also, there is an order for Glucose 50% (a standard treatment for high potassium levels). The patient is treated with tacrolimus (may cause high potassium).	Communicated an order of insulin + glucose in a patient with normal blood glucose	Communicated treatment with tacrolimus (provided the current medications)
Behavior Case: A 19 y/o male admitted for sickle cell crisis is disoriented and pulled out his IV. The patient has a low sodium level and a high WBC.	Communicated a problem of an acutely confused patient	Communicated any of the following: sodium level/ WBC (provided laboratory results)
High Blood Pressure Case: An 85 y/o female has a high blood pressure of 180/90 mmHg. Home treatment with clonidine was discontinued (causes rebound blood pressure).	Communicated a problem of blood pressure 180/90	Communicated home treatment with clonidine (provided home medications)
Medication Case: A 31 y/o female has difficulty sleeping and asks for a sleeping pill. The patient was admitted for acute liver injury (most sleep medications are contraindicated), and is treated at home with a CPAP (this treatment should be reinstated before sleep medication).	Communicated request for a sleeping pill + hospitalization for acute liver injury	Communicated home treatment with a CPAP (provided the medical history)
Chest Pain Case: A 61 y/o female complains of chest pain. The patient has a swelling of the leg (suspicious of PE).	Communicated chest pain + leg swelling	None

* y/o, year-old; IV, intravenous; WBC, white blood cell; CPAP, continuous positive airway pressure; PE, pulmonary embolism.

† A situation cue evaluated the generic Situation, Background, Assessment, Recommendation (SBAR) framework in terms of the understanding and communication of a patient's general situation on a high level. A background cue evaluated the communication of problem-specific information indicated on the SBAR forms, such as medical history, medications, and laboratory results.

they use the form while evaluating the remaining three cases (SBAR cases). Because we sought to evaluate the effect of an SBAR form introduced into an (unsupervised) clinical environment, we did not enforce the nurses' use of the form but rather allowed them to use the forms in whatever manner they saw fit. Physicians were told that a nurse would call them with a simulated acute patient problem and were asked to manage the case as if it were real. Physicians were blinded to the research questions and were not aware whether the SBAR form was used by the nurse. The cumulative time to review the six medical records was limited to two hours. The duration of the calls was not limited. Calls were recorded in video by digital portable devices and analyzed by a nonblinded reviewer [E.J.]. To reduce possible biases, we limited the evaluation to the explicit communication of a list of data items (Table 1). The first three sessions were used to pilot the study protocol and were excluded from the analysis.

Data Collection

We determined whether nurses reported the situation and background cues. In the two cases in which there were two possible background cues, it was sufficient to report either one. We also evaluated the nurse's independent communication (that is, without prompting by the physician) of situation data items (that is, name and age of the patient, and stating of the problem and its severity and urgency), background data items (for example, signs and symptoms, reason for admission, medical history, vital signs, medication), and providing an assessment and recommendation.

Evaluation of both control and SBAR cases was based on the data elements listed on the SBAR forms. The rationale for using this method was that the SBAR form listed a set of data elements that an expert panel deemed to be required for an appropriate evaluation. We calculated the extent of extracted data as the ratio between the number of data items communicated by the nurse and the total number of relevant data items for that particular case, as follows:

$$\text{Extracted Data} = \frac{\text{Data elements communicated by the nurse}}{\text{Total number of relevant data elements}}$$

We defined the total number of relevant data items for a given

case as the total number of unique items reported collectively by all nurses (that is, relative recall). This was done because not all items on the forms were relevant for the evaluation of the presented cases. We reviewed nurses' notes to establish which data were extracted from the record but not communicated. We recorded the time it took to review each record, the time elapsed between the beginning of the phone conversation and when the reason for the call was communicated, and the total length of the call. Physicians were evaluated for their ability to elicit the required information regarding the situation and background cues (for example, asking for the most recent laboratory results in the confused patient).

Statistical Analysis

Statistical analyses were performed using SPSS (Version 20, IBM Inc., Chicago). We used a generalized estimating equations (GEEs) analysis to evaluate the association between the use of SBAR forms and properties of the communication. We chose GEEs with model-based estimators to control for repeated measures within subjects and cases, missing observations, and non-normal distribution of our data.[12] We conducted the analysis sequentially. Starting each analysis with a model containing only main effects and targeted interactions (if any), we identified the best-fitting link function for the distributions (normal, Poisson, negative binomial, inverse Gaussian, and Gamma distributions for numerical variables and binomial distribution for binary variables). We then identified the best-fitting model with the most appropriate working correlation matrix (unstructured, independent, or compound symmetry) as the model with the lowest Quasi likelihood under Independence model Criterion (QIC).

Results

Phone Calls

Of the 132 (22 [RN–internal medicine physician pairs] X 6 [cases]) expected phone consultations, 12 were canceled because the nurse did not come to the laboratory or the physician did not respond to the phone call. Eighteen were used to pilot the protocol, 5 were excluded because the nurse did not use the SBAR form, 3 were excluded because of errors in the presentation of the case, and 2 were canceled because of time constraints. A total of 92 phone consultations (17 nurse-physician pairs) were analyzed; 43 cases with the SBAR form (SBAR cases) and 49 controls. In 12% (5/43) of the SBAR cases, nurses used both the form and their own separate notes to document data. In all these cases, nurses eventually relied on their own notes when communicating with the physician.

Communication of Situation and Background Cues

There was no difference in the rate of communicated situation cues between the SBAR and control cases (88% versus 84% respectively, $p = .60$). Using the SBAR forms was associated, although not significantly, with a lower rate of reporting the background cue (14% versus 31%, $p = .08$). On the other hand, using the SBAR form was associated with a higher rate of communicating the reason for hospitalization and medical history (95% versus 78% and 91% versus 71%, respectively, $p = .03$). In both the SBAR and control cases, some nurses failed to report the cues despite extracting the relevant data from the record: specifically, 4% (4/92) of the situation cues and 9% (7/81) of the background cues for the SBAR and control cases together. In both the SBAR and control cases, some nurses reported wrong and misleading information that obscured the cues (for example, a nurse stated that the patient's laboratory results were all normal when in fact he had a low sodium level). On average, nurses reported wrong information regarding 5% (5/92) of the situation cues and 5% (4/81) of the background cues.

Of the cases in which the nurse failed to communicate the background cue, physicians asked guiding questions that were meant to elicit the information (for example, "What were the last lab results?" for the confused patient, or "What medications were given to the patient?" for the patient with hyperkalemia) in only 6% (2/31) and 16% (5/31) in the SBAR and control cases, respectively ($p = .39$). There was no difference in communicating the situation or background cues between the various cases ($p = .54$ and $p = .57$, respectively).

Information Content and Properties of Calls

In both the SBAR and control cases, nurses reported a similar number of data items describing the current situation (58% versus 59%, respectively, $p = .95$) and the medical background (31% versus 29%, $p = .15$). There was a higher rate of reporting wrong information in the SBAR cases, but this was not statistically significant (16% versus 6%, $p = .13$).

The time it took nurses to review records was similar in both SBAR and control cases. There was no association between use of the SBAR form and the time elapsed from the beginning of the conversation until the nurse communicated the reason for the call, nor was there any association to the length of the call.

Nurses provided an assessment or a recommendation for the presented case in 19% and 24% of the SBAR and control cases. In approximately two thirds of cases where nurses provided an assessment or recommendation nurses either did not identify the background cue or gave a recommendation that did not address

Table 2. Cues and Call Properties in the SBAR and Control Cases*

	SBAR (*N* = 43 Calls)†	Control (*N* = 49 Calls)†	*P* Value
Situation Cue			
Nurse communicated the situation cue.	88% (38/43)	84% (41/49)	.60
Nurse failed to report the situation cue despite extracting the data from the record.	7% (3/43)	2% (1/49)	.31
Nurse reported a wrong situation cue.	5% (2/43)	6% (3/49)	.69
Physician asked specifically for the situation cue.	60% (3/5)	63% (5/8)	N/S‡
Background Cue			
Nurse communicated the background cue.	14% (5/36)	31% (14/45)	.08
Nurse failed to report the background cue despite extracting the data from the record.	6% (2/36)	11% (5/45)	.39
Nurse reported a wrong background cue.	8% (3/36)	2% (1/45)	.24
Physician asked specifically for the background cue.	6% (2/31)	16% (5/31)	.39
Data Items Regarding the Patient's Situation			
Number of independently provided situation data items	2.4 ± 1.0	2.4 ± 0.9	.99
Ratio of extracted data§	0.58 ± 0.2	0.59 ± 0.2	.95
Situation items physician asked about	0.1 ± 0.2	0.2 ± 0.4	.14
Nurse communicated severity.	12% (5/43)	2% (1/49)	.10
Nurse communicated urgency.	0	0	N/S‡
Data Items Regarding the Patient's Background			
Number of independently provided background data items	5.1 ± 2.4	4.5 ± 2.4	.59
Ratio of extracted data§	0.31 ± 0.15	0.29 ± 0.14	.15
Background items physician asked about	1.0 ± 1.3	1.4 ± 1.7	.31
Rate of communicating wrong background data‖	16% (7/43)	6% (3/49)	.13
Nurse communicated reason for admission.	95% (41/43)	78% (38/49)	.03
Nurse communicated medical history.	91% (39/43)	71% (35/49)	.03
Nurse communicated associated signs and symptoms.	40% (17/43)	41% (20/49)	.90
Nurse communicated current medications.	23% (10/43)	20% (10/49)	.74
Nurse communicated vital signs.	37% (16/43)	41% (20/49)	.72
Time Measures			
Time to review record (minutes)	11.1 ± 4.3	12.9 ± 7.8	.84
Length of call (minutes)	4.4 ± 3.4	5.9 ± 4.4	.56
Time to state reason for call (seconds)	27 ± 28	34 ± 49	.30
Assessment and Recommendations			
Provided an assessment or recommendation	19% (8/43)	24% (12/49)	.60
Provided a wrong assessment or recommendation	63% (5/8)	67% (8/12)	N/S‡

* SBAR, Situation, Background, Assessment, Recommendation.

† Applicable values are presented as mean ± standard deviation.

‡ N/S, nonsignificant. Sample size is too small for statistical analysis.

§ Communicated data/relevant data items. The number of relevant data items was calculated as the total number of unique data items communicated collectively for a given case by all nurses (that is, relative recall).

‖ Rate is calculated on a per case basis (that is, one or more errors would count as a single error). In reality there may be multiple errors in a single case.

the cue (Table 2, above). For example, a nurse requested restraints for the confused patient but did not notice the very low sodium levels that may have caused the patient's confusion.

Discussion

Communication problems are common in after-hours phone calls between nurses and physicians. In the majority of cases, nurses failed to identify and report case-specific information pertaining to the cause of the problem (background cues); SBAR forms did not improve communication content or time and were even associated with a trend toward poorer communication. Most nurses communicated the reason for the call (situation cues) regardless of the provision of SBAR forms (88% versus 84%, $p = .60$). Nurses did not report 10% of the situation cues and 14% of the background cues despite their having extracted the relevant data from the record or reported wrong information.

In the majority of cases in which the background cues were not provided, physicians failed to ask questions that could have resulted in the communication of the cue.

Our study has several limitations. First, nurses were not required to adhere to the content of the form. Our rationale was that template formats with a predefined rigid structure may actually increase the potential for error by requiring too much information.[4] We therefore designed an intervention that allowed for professional discretion. Furthermore, in allowing noncompliance, we aimed at assessing effectiveness rather than efficacy. A second limitation is that, to isolate the effect of the SBAR forms, we conducted a laboratory study. Accordingly, nurses could not see the patients and were therefore deprived of an important source of information. In addition, neither the physicians nor the nurses had any prior knowledge of the patient. On the other hand, unlike real life, nurses were afforded ample time to review the patients' records without distractions. Third, all nurses were employed by large academic hospitals and may have been trained in the SBAR method. Because we did not collect data regarding prior SBAR training, the high rates of communicating the situation cues and the lack of difference in reporting these cues with and without the SBAR forms should be interpreted with caution. A third limitation is that we had to cancel a substantial number of sessions because of technical problems, more so for the SBAR cases. To control for theses missing observations and for the nested design of our study, we used the GEE method. However, considering the relatively small sample size, our results should be interpreted with caution. Finally, it is possible that forms designed differently could have led to better results.

Contrary to previous studies, we did not find that use of an SBAR template improved performance.[7,9,10] Irrespective of the use of the SBAR forms, nurses generally performed well at communicating the general situation (situation cues) and performed poorly at identifying and communicating more subtle data pertaining to the cause of the clinical condition (background cues). Regarding the situation cues, our findings may have differed from prior work because previous studies mainly focused on novice health care workers and evaluated the communication of basic information.[6,13] Our subjects, on the other hand, were experienced nurses, and thus it is not surprising that they reliably communicated fundamental data.

It is not clear why the SBAR form did not improve (and may have hampered) reporting of background cues. The SBAR forms were designed to contain the cues, but this translated to the communication of key information in only 14% (5/36) of the cases (in an additional 6% nurses extracted the cue but did not communicate it and in 8% they reported incorrect data). Moreover, on average, nurses collected and reported only 58% of the situation and 31% background items that were relevant to the specific case, despite having explicit instructions on the form. It is not clear why nurses failed to collect and report important data. One explanation is that they did not realize the relevance and importance of the specified information.[14] For example, nurses may not be aware of the associations between clonidine withdrawal and high blood pressure (High Blood Pressure Case, Table 1) or of tacrolimus treatment and high potassium (Glucose Case, Table 1). However, it is less likely that experienced nurses would fail to recognize the significance of a low sodium level in a confused patient or the importance of a recent hospitalization in a persistent fever case. It is possible that the current culture in the hospital does not empower nurses to take an active role in their communication with physicians, so that they passively waited for the physician to ask for information rather than actively provide it.[15] This could explain the low rates of assessment and recommendations made by nurses. However, the nurses generally spent considerable time going over the records and then had lengthy phone conversations. Thus, it does not seem that nurses were "passive" but that they just failed to communicate the most relevant information. Another possible explanation could be that data were not easily accessible or that the forms were too cumbersome. However, study cases were based on real patient records, representing the reality of work on the inpatient wards. Further, the requested data on the forms were fairly standard (for example, medications, vital signs, laboratory results) and nurses had ample time to review the records, Hence, it remains unclear why in so many cases nurses failed to follow the instructions on the form. One remaining possible explanation is rooted in the phenomenon of overconfidence—a miscalibration of one's own sense of accuracy—which has been recognized as a key reason for physicians' lack of adherence with guidelines and protocols.[14] Similarly, it is possible that nurses felt that they had collected all the necessary data to describe the case and were therefore reluctant to search for additional data.

Our observations demonstrate a "Catch 22," whereby interventions meant to overcome human shortcomings fail because they are dependent on humans for their execution. Such is the SBAR framework, which, regardless of specific implementation, relies on professional critical thinking. In the case of a very general form—the generic SBAR framework—the nurse has to possess considerable knowledge to provide the physician with all the needed information. In the case of a problem-specific form (like the one we studied), the nurse needs to decide what information to exclude so as not to overload the physician.[4] Further, as we

demonstrated, highly detailed forms are associated with low compliance. Even if we were to design forms that are very short and highly specific to various problems, we would still have to rely on the nurse to choose the appropriate form or forms,[14] and there will always be a certain rate of human error that is not mitigated by this intervention. As our results show, relying on the physicians to elicit the necessary information is problematic as well.

Finally, the question remains whether interventions to increase the amount and relevance of communicated information improve patient safety and care quality.[11] Thorough data collection does not guarantee correct interpretation.[16] Field et al. demonstrated that using an SBAR protocol designed specifically to communicate information associated with warfarin monitoring had no effect on the rate of actual or potential adverse events and was actually associated with a small decrease in compliance with monitoring guidelines.[17] Similarly, use of a structured communication tool for patient handoffs between ambulance personnel and emergency room staff was associated with a decrease in recall of patient data.[8]

Conclusions

Key information was often not communicated during simulated after-hours phone calls from internal medicine ward nurses to on-call physicians. Problem-specific SBAR forms did not improve this communication and may even have had some negative effects. The physicians frequently failed to ask the necessary question to rectify the situation. This study demonstrates the potential risk inherent in after-hours phone consultation and the possible limitations of SBAR-based interventions. J

This study was funded in part by a grant from the University of Texas System Patient Safety Committee (to Elmer V. Bernstam, James P. Turley, Kevin O. Hwang, and Todd R. Johnson) and by a training fellowship from the Keck Center Computational Cancer Biology Training Program of the Gulf Coast Consortia (CPRIT Grant No. RP101489 to Erel Joffe).

Erel Joffe, MD, MS, is Postdoctoral Research Fellow, School of Biomedical Informatics, University of Texas Health Science Center at Houston. **James P. Turley, PhD,** is Adjunct Associate Professor of Biomedical Informatics; and **Kevin O. Hwang, MD, MPH,** is Assistant Professor of Internal Medicine. **Todd R. Johnson, PhD,** formerly Professor, School of Biomedical Informatics, University of Texas Health Science Center at Houston, is Professor, Division of Biomedical Informatics, Department of Biostatistics, University of Kentucky at Lexington. **Craig W. Johnson, PhD,** is Associate Professor of Biomedical Informatics, University of Texas Health Science Center at Houston; and **Elmer V. Bernstam, MD, MS, MSE,** is Professor of Biomedical Informatics and Internal Medicine. Please address correspondence to Elmer V. Bernstam, Elmer.V.Bernstam@uth.tmc.edu.

Online-Only Content

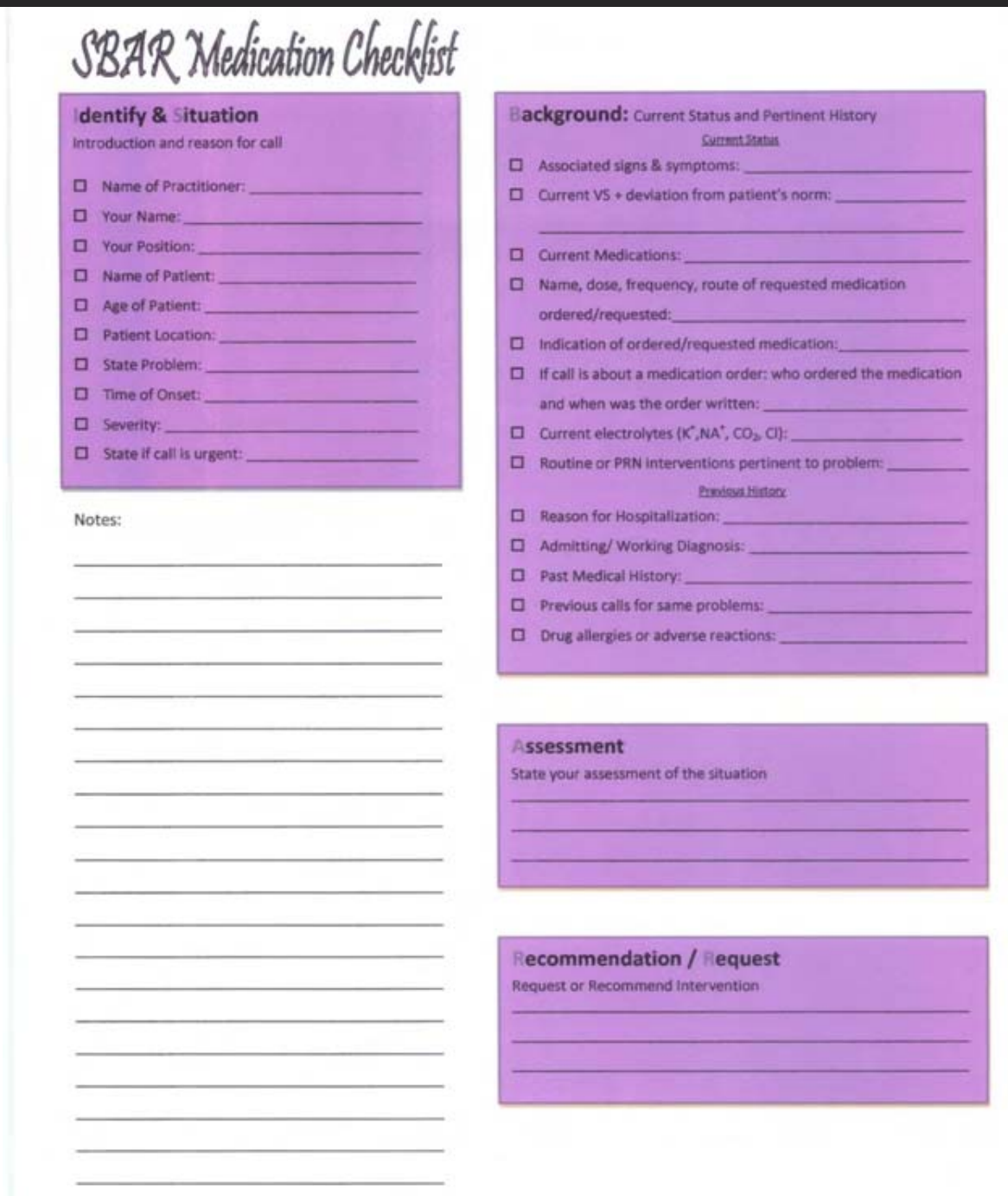
See the online version of this article for
Appendix 1. Sample SBAR Templates

References

1. Bernstam EV, et al. Reasons for after-hours calls by hospital floor nurses to on-call physicians. *Jt Comm J Qual Patient Saf.* 2007;33(6):342–349.
2. Petersen LA, et al. Does housestaff discontinuity of care increase the risk for preventable adverse events? *Ann Intern Med.* 1994 Dec 1;121(11):866–872.
3. Tjia J, et al. Nurse-physician communication in the long-term care setting: Perceived barriers and impact on patient safety. *J Patient Saf.* 2009;5(3):145–152.
4. Cheung DS, et al. Improving handoffs in the emergency department. A*nn Emerg Med.* 2010;55(2):171–180.
5. Riesenberg LA, Leitzsch J, Little BW. Systematic review of handoff mnemonics literature. *Am J Med Qual.* 2009;24(3):196–204.
6. Marshall S, Harrison J, Flanagan B. The teaching of a structured tool improves the clarity and content of interprofessional clinical communication. *Qual Saf Health Care.* 2009;18(2):137–40.
7. Haig KM, Sutton S, Whittington J. SBAR: A shared mental model for improving communication between clinicians. *Jt Comm J Qual Patient Saf.* 2006;32(3):167–175.
8. Talbot R, Bleetman A. Retention of information by emergency department staff at ambulance handover: Do standardised approaches work? *Emerg Med J.* 2007;24(8):539–42.
9. Leonard M, Graham S, Bonacum D. The human factor: The critical importance of effective teamwork and communication in providing safe care. *Qual Saf Health Care.* 2004;13 Suppl 1:i85–90.
10. Finnigan MA, Marshall SD, Flanagan BT. ISBAR for clear communication: One hospital's experience spreading the message. *Aust Health Rev.* 2010; 34(4):400–404.
11. Cohen MD, Hilligoss PB. The published literature on handoffs in hospitals: Deficiencies identified in an extensive review. *Qual Saf Health Care.* 2010; 19(6):493–497.
12. Pan W. Akaike's information criterion in generalized estimating equations. *Biometrics*. 2001;57(1):120–125.
13. Thompson JE, et al. Using the ISBAR handover tool in junior medical officer handover: A study in an Australian tertiary hospital. *Postgrad Med J.* 2011;87(1027):340–344.
14. Berner ES, Graber ML. Overconfidence as a cause of diagnostic error in medicine. *Am J Med.* 2008;121(5 Suppl):S2–23.
15. Kuokkanen L, Leino-Kilpi H. Power and empowerment in nursing: Three theoretical approaches. *J Adv Nurs.* 2000;31(1):235–241.
16. Elstein AS. Thinking about diagnostic thinking: A 30-year perspective. *Adv Health Sci Educ Theory Pract.* 2009;14 Suppl 1:7–18.
17. Field TS, et al. Randomized trial of a warfarin communication protocol for nursing homes: An SBAR-based approach. *Am J Med.* 2011;124(2):179.e1–7.

Online-Only Content

Appendix 1. Sample SBAR Templates*



SBAR Medication Checklist

Identify & Situation
Introduction and reason for call

- ☐ Name of Practitioner: _____
- ☐ Your Name: _____
- ☐ Your Position: _____
- ☐ Name of Patient: _____
- ☐ Age of Patient: _____
- ☐ Patient Location: _____
- ☐ State Problem: _____
- ☐ Time of Onset: _____
- ☐ Severity: _____
- ☐ State if call is urgent: _____

Notes:

Background: Current Status and Pertinent History

Current Status

- ☐ Associated signs & symptoms: _____
- ☐ Current VS + deviation from patient's norm: _____
- ☐ Current Medications: _____
- ☐ Name, dose, frequency, route of requested medication ordered/requested: _____
- ☐ Indication of ordered/requested medication: _____
- ☐ If call is about a medication order: who ordered the medication and when was the order written: _____
- ☐ Current electrolytes (K^+, NA^+, CO_2, Cl): _____
- ☐ Routine or PRN interventions pertinent to problem: _____

Previous History

- ☐ Reason for Hospitalization: _____
- ☐ Admitting/ Working Diagnosis: _____
- ☐ Past Medical History: _____
- ☐ Previous calls for same problems: _____
- ☐ Drug allergies or adverse reactions: _____

Assessment
State your assessment of the situation

Recommendation / Request
Request or Recommend Intervention

SBAR, Situation, Background, Assessment, Recommendation.

(continued on page AP2)

Online-Only Content

Appendix 1. Sample SBAR Templates* (continued)

SBAR Blood Glucose Checklist

Identify & Situation

Introduction and reason for call

- ☐ Person Called: _____
- ☐ Your Name: _____
- ☐ Your Position: _____
- ☐ Your Location: _____
- ☐ Name of Patient: _____
- ☐ Age of Patient: _____
- ☐ Patient Location: _____
- ☐ State Problem: _____
- ☐ Time of Onset: _____
- ☐ Severity: _____
- ☐ State if call is urgent: _____

Notes:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Background: Current Status and Pertinent History

Current Status

- ☐ Current Glucose Reading: _____
- ☐ Previous Glucose Reading: _____
- ☐ Associated Signs & Symptoms: _____
- ☐ Current diet: _____
- ☐ Current Electrolytes (K^+, Na^+, CO_2, Cl): _____
- ☐ Current creatinine: _____
- ☐ Current VS + any deviation from patient's norm: _____
- ☐ Current Medications: _____

Pertinent History

- ☐ Reason for Hospitalization: _____
- ☐ Admitting/ Working Diagnosis: _____
- ☐ Past Medical History: _____
- ☐ Chronic/ Pre-hospitalization medications for glucose control: _____
- ☐ Time & Dose of Last Glucose Control Medication (oral hypoglycemic or insulin): _____
- ☐ Presence/Absence of Sliding Scale Insulin Order – date, time, & last dose administered: _____
- ☐ Presence/Absence of missed hypoglycemia dose in past 24 hours: _____
- ☐ Presence/Absence of infusing IV + type of fluid: _____
- ☐ Presence/Absence of labile glucose history: _____
- ☐ Routine or PRN interventions pertinent to problem: _____
- ☐ Mental Status: _____
- ☐ Skin color, temperature, & moistness: _____
- ☐ Previous calls for same problem: _____
- ☐ Drug allergies or adverse reactions: _____

Assessment

State your assessment of the situation

_____

_____

_____

Recommendation / Request

Request or Recommend Intervention

_____

_____

_____

(continued on page AP3)

Online-Only Content

Appendix 1. Sample SBAR Templates* (continued)

SBAR Elevated BP Checklist

Identify & Situation

Introduction and reason for call

- ☐ Person Called: _____
- ☐ Your Name: _____
- ☐ Your Position: _____
- ☐ Your Location: _____
- ☐ Name of Patient: _____
- ☐ Age of Patient: _____
- ☐ Patient Location: _____
- ☐ State Problem: _____
- ☐ Time of Onset: _____
- ☐ Severity: _____
- ☐ State if call is urgent: _____

Notes:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Background: Current Status and Pertinent History

Current Status

- ☐ Associated Signs & Symptoms: _____
- ☐ Current Electrolytes (K^+, Na^+, CO_2, Cl): _____
- ☐ Highest & Lowest BP in past 48 hours – date & time of each reading: _____
- ☐ Current VS + any deviation from patient's norm: _____
- ☐ Current Medications: _____

Previous History

- ☐ Reason for Hospitalization: _____
- ☐ Admitting/ Working Diagnosis: _____
- ☐ Past Medical History: _____
- ☐ Presence/Absence of chronic pre-hospitalization antihypertensive medications or diuretics: _____
- ☐ Presence/ Absence of pain medication administration – date & time of last dose: _____
- ☐ Presence/Absence of infusing IV+ type of fluid: _____
- ☐ Fluid balance over past 24 & 48 hours: _____
- ☐ Routine or PRN interventions pertinent to problem: _____
- ☐ Previous calls for same problem: _____
- ☐ Drug allergies or adverse reactions: _____

Assessment

State your assessment of the situation

- ☐ Presence/Absence of anxiety or agitation: _____
- ☐ Presence/Absence of peripheral edema: _____
- ☐ Presence/Absence of SOB: _____
- ☐ Presence/Absence of pain: _____
- ☐ Assessment of breath sounds: _____

Recommendation / Request

Request or Recommend Intervention

_____

_____

_____

(continued on page AP4)

Online-Only Content

Appendix 1. Sample SBAR Templates* (continued)

SBAR Elevated Temperature Checklist

Identify & Situation
Introduction and reason for call

- ☐ Person Called: _____
- ☐ Your Name: _____
- ☐ Your Position: _____
- ☐ Your Location: _____
- ☐ Name of Patient: _____
- ☐ Age of Patient: _____
- ☐ Patient Location: _____
- ☐ State Problem: _____
- ☐ Time of Onset: _____
- ☐ Severity: _____
- ☐ State if call is urgent: _____

Notes:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Background: Current Status and Pertinent History

Current Status

- ☐ Current temperature & method of measurement (oral, ear, axillary, rectal): _____
- ☐ Temperature high & low reading over past 24 hours + method of measurement (oral, ear, axillary, rectal): _____
- ☐ Associated Signs & Symptoms: _____
- ☐ Skin color, temperature, moisture: _____
- ☐ Presence/Absence of redness, swelling, temperature, tenderness around incision site: _____
- ☐ Presence/ Absence of SOB, chest pain, cough: _____
- ☐ Presence/Absence of calf tenderness/warmth: _____
- ☐ Presence/Absence of difficulty voiding or change in urine color: _____
- ☐ Current VS + any deviation from patient's norm: _____
- ☐ Current Medications: _____

Previous History

- ☐ Reason for Hospitalization: _____
- ☐ Admitting/ Working Diagnosis: _____
- ☐ Past Medical History: _____
- ☐ Presence/Absence of chest X-ray findings & date of X-ray: _____
- ☐ Presence/Absence of antibiotics: _____
- ☐ Presence/Absence of cultures & date of findings: _____
- ☐ Presence/Absence of antipyretic medications & time last administered: _____
- ☐ Routine or PRN interventions pertinent to problem: _____
- ☐ Previous calls for same problem: _____
- ☐ Drug allergies or adverse reactions: _____

Assessment
State your assessment of the situation

_____
_____
_____

Recommendation / Request
Request or Recommend Intervention

_____
_____
_____

(continued on page AP5)

Online-Only Content

Appendix 1. Sample SBAR Templates* (continued)

SBAR Pain Checklist

Identify & Situation

Introduction and reason for call

- ☐ Person Called: _____
- ☐ Your Name: _____
- ☐ Your Position: _____
- ☐ Your Location: _____
- ☐ Name of Patient: _____
- ☐ Age of Patient: _____
- ☐ Patient Location: _____
- ☐ State Problem: _____
- ☐ Time of Onset: _____
- ☐ Severity: _____
- ☐ State if call is urgent: _____

Notes:

Background: Current Status and Pertinent History

Current Status

- ☐ Location of pain: _____
- ☐ Cause of pain: _____
- ☐ Severity of pain: _____
- ☐ Quality of pain: _____
- ☐ Type and duration of pain episodes: _____
- ☐ Presence/Absence of radiation: _____
- ☐ Interventions that relieve pain: _____
- ☐ Factors that exacerbate pain: _____
- ☐ Associated signs & symptoms: _____
- ☐ State pertinent findings from physical assessment of patient: _____
- ☐ Current VS + deviation from patient's norm: _____
- ☐ Current Medications: _____

Pertinent History

- ☐ Reason for Hospitalization: _____
- ☐ Admitting/ Working Diagnosis: _____
- ☐ Past Medical History: _____
- ☐ Pain medications administered, dose, time last administered, patient response: _____
- ☐ Routine or PRN interventions pertinent to problem: _____
- ☐ Previous calls for same problems: _____
- ☐ Drug allergies or adverse reactions: _____

Assessment

State your assessment of the situation

_____

_____

_____

Recommendation / Request

Request or Recommend Intervention

_____

_____

_____

(continued on page AP6)

Online-Only Content

Appendix 1. Sample SBAR Templates* (continued)

SBAR Behavior Checklist

Identify & Situation

Introduction and reason for call

- ☐ Person Called: _____
- ☐ Your Name: _____
- ☐ Your Position: _____
- ☐ Your Location: _____
- ☐ Name of Patient: _____
- ☐ Age of Patient: _____
- ☐ Patient Location: _____
- ☐ State Problem: _____
- ☐ Time of Onset: _____
- ☐ Severity: _____
- ☐ State if call is urgent: _____

Notes:

Background: Current Status and Pertinent History

Current Status

- ☐ Description of behavior & duration of episode: _____
- ☐ Level of consciousness: _____
- ☐ Presence/Absence of posing harm to self or others: _____
- ☐ Current blood glucose: _____
- ☐ Current Electrolytes (K^+, Na^+, CO_2, Cl): _____
- ☐ Oxygen Saturation Level: _____
- ☐ Comfort aids offered (e.g. backrub, freshening bed, fresh water, toileting, room darkening, etc.): _____
- ☐ Known causes for anxiety of worry: _____
- ☐ Associated Signs & Symptoms: _____
- ☐ Current VS + any deviation from patient's norm: _____
- ☐ Current Medications: _____

Pertinent History

- ☐ Reason for Hospitalization: _____
- ☐ Admitting/ Working Diagnosis: _____
- ☐ Past Medical History: _____
- ☐ Presence/Absence of anxiolytics or sedatives – date & time of last dose: _____
- ☐ Presence/Absence of chronic, pre-hospitalization medications for neuropsychiatric disorders: _____
- ☐ Routine or PRN interventions pertinent to problem: _____
- ☐ Previous calls for same problem: _____
- ☐ Drug allergies or adverse reactions: _____

Assessment

State your assessment of the situation

Recommendation / Request

Request or Recommend Intervention